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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
MABRY, JOHN	

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jgardner@oblon.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JEAN-PIERRE CATINAT and MICHEL STREBELLE

Appeal 2010-004054
Application 10/534,502
Technology Center 1600

Before ERIC GRIMES, FRANCISCO C. PRATS, and JEFFREY N. FREDMAN, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a method of making epichlorohydrin (1,2-epoxy-3-chloropropane). The Examiner has rejected the claims as obvious based on the prior art. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

Claims 11-26 are on appeal. Claim 11 is the only independent claim and reads as follows:

11. A process for the manufacture of 1,2-epoxy-3-chloropropane comprising reacting allyl chloride and hydrogen peroxide in an epoxidation medium comprising at least one liquid phase and in the presence of a catalyst comprising a zeolite, wherein the pH of the liquid phase is controlled and maintained at a value of greater than or equal to 1.5 and less than 4.8.

The Examiner has rejected claims 11-26 under 35 U.S.C. § 103(a) as obvious based on Strebelle,[1] Nakanishi,[2] and Gilbeau[3] (Answer 4). The Examiner finds that Strebelle and Nakanishi both teach reacting allyl chloride and hydrogen peroxide to make epichlorohydrin (Answer 4-5). The Examiner finds that "[i]t is well known in the art that it is advantageous to control acidity of this reaction at a pH range of, preferably, 2 to 8 as described by Gilbeau et al (see entire disclosure in particular column 3, lines 34-53)" (*id.* at 5).

Appellants contend that the "portion of Gilbeau's teaching upon which the Examiner specifically relies . . . relates exclusively to Gilbeau's regeneration treatment for regenerating spent zeolite catalyst" (Appeal Br. 9) rather than a process for reacting allyl chloride with hydrogen peroxide to produce epichlorohydrin.

We agree with Appellants that the Examiner has not provided sufficient evidence to support a prima facie case of obviousness. The claims

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[1] Strebelle et al., US 6,288,248, Sep. 11, 2001.
[2] Fukuda et al., JP 04327582, Nov. 17, 1992. The Examiner and Appellants refer to this reference as Nakanishi, so we will as well.
[3] Gilbeau, US 6,063,941, May 16, 2000.

require reacting allyl chloride with hydrogen peroxide while maintaining the pH between 1.5 and 4.8. The Examiner relies on Gilbeau as a basis for concluding that the recited pH range would have been obvious (Answer 5).

As Appellants point out, however, the passage in Gilbeau that discloses maintaining a pH of 2 to 8 relates to a process for regenerating a catalyst, not a process of producing epichlorohydrin. Gilbeau discloses that "catalysts of titanium silicalite type . . . are used in particular in reactions between hydrogen peroxide and an organic coreactant" (Gilbeau, col. 1, ll. 9-11); i.e., reactions like that of allyl chloride and hydrogen peroxide. "However, the activity of these catalysts rapidly falls" (*id.* at col. 1, l. 22). Gilbeau discloses "a process for the regeneration of catalysts of titanium silicalite type" (*id.* at col. 1, ll. 34-35).

Gilbeau discloses that its regeneration solution can be composed essentially of the same oxidizing agent used in the epoxidation reaction (*id.* at col. 2, ll. 6-7) but the "regeneration treatment is carried out in the substantial absence of the organic coreactant" (*id.* at col. 2, ll. 17-18). Gilbeau discloses that the catalyst is preferably washed "prior to the treatment with the liquid solution containing the oxidizing agent" (*id.* at col. 3, ll. 2-3).

Gilbeau then states that "[i]t can be advantageous to control the pH during the treatment. . . . The treatment is preferably carried out at a pH maintained in the range from 2 to 8." (*Id.* at col. 3, ll. 29-41.) We agree with Appellants that a person of ordinary skill in the art would have interpreted this suggestion to apply only to the regeneration process disclosed by Gilbeau, not to the initial epoxidation reaction that necessitates

regenerating the catalyst. Thus, Gilbeau does not suggest controlling pH during the reaction of allyl chloride and hydrogen peroxide, as required by the claims on appeal.

The Examiner argues that

> Strebelle clearly discloses the affect [sic] of an acid (pH) would have on the catalyst for re-use and regeneration of the catalyst. In an analogous process, Strebelle states that it would be advantageous to regenerate the catalyst by treatment with a solution comprising an oxidizing agent such as hydrogen peroxide, ozone or an organic peroxide (see column 3, lines 34-43).

(Answer 6.) The cited passage of Strebelle, however, merely indicates the need to regenerate a catalyst before re-using it in an epoxidation reaction. It does not provide any reason to control the pH, during either the epoxidation reaction or regeneration treatment.

In summary, the Examiner has not provided sufficient evidence to support a conclusion that carrying out the claimed process, "wherein the pH of the liquid phase is controlled and maintained at a value of greater than or equal to 1.5 and less than 4.8" (claim 11) would have been obvious to a person of ordinary skill in the art based on the disclosures of Strebelle, Nakanishi, and Gilbeau. The rejection of claims 11-26 under 35 U.S.C. § 103(a) is reversed.

REVERSED

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